Listing of Claims:

Claim 1. (Previously presented) An apparatus for exposing only a selected portion of a length of optical fiber to a hydrogen atmosphere loading process, the apparatus comprising:

a loading chamber that encloses at least the selected portion of the optical fiber and contains a hydrogen atmosphere;

at least one pressure seal in contact with at least one end section of the selected portion of the optical fiber; and

at least one heating element that regionally heats the hydrogen atmosphere surrounding the selected portion.

Claim 2. (Original) The apparatus of claim 1, wherein the heating element heats the hydrogen atmosphere to a temperature of at least 250°C.

Claim 3. (Original) The apparatus of claim 1, wherein the loading chamber is a pressure chamber capable of containing a pressurized atmosphere.

Claim 4. (Original) The apparatus of claim 1, wherein the chamber is designed to contain pressures up to 3,000 psi.

Claim 5. (Original) The apparatus of claim 1, wherein the loading chamber encloses only the selected portion of a continuous length of optical fiber.

Claim 6. (Original) The apparatus of claim 1, wherein the loading chamber comprises a first tube concentrically surrounding only the selected portion of the optical fiber.

Claim 7. (Previously presented) The apparatus of claim 6 wherein the at least one pressure seal comprises gas seals that are positioned at ends of the first tube, which contain the hydrogen atmosphere while allowing passage of the length of optical fiber.

Claim 8. (Previously presented) The apparatus of claim 1 wherein the at least one pressure seal comprises gas seals that are attached to end sections of the selected portion of the optical fiber.

Claim 9. (Previously presented) The apparatus of claim 1, further comprising cooling tubes attached to ends of a first tube concentrically surrounding the selected portion of the optical fiber, wherein the cooling tubes define cooling areas and the cooling tubes include seals that separate the cooling areas from the loading chamber.

Claim 10. (Previously presented) The apparatus of claim 1, wherein the loading chamber comprises a vessel enclosing the entire length of optical fiber, wherein the heating element is positioned adjacent the selected portion of the optical fiber.

Claim 11. (Original) The apparatus of claim 1, further comprising a reel-to-reel arrangement, wherein end portions of the length of the optical fiber are wound on laterally spaced reels and the selected portion is suspended midspan.

Claim 12. (Original) The apparatus of claim 10, wherein the vessel is a pressure bell capable of containing high-pressure atmospheres.

Claim 13. (Previously presented) The apparatus of claim 1, further comprising first and second clamping vessel blocks, the vessel blocks having pockets that define the loading chamber when the vessel blocks are clamped together.

Claim 14. (Original) The apparatus of claim 1, further comprising cooling regions that cool portions of the fiber adjacent to the selected portion.

Claim 15. (Original) The apparatus of claim 1, further comprising a cooling region and a mechanism that moves the fiber from the loading chamber to the cooling region.

Claim 16. (Original) The apparatus of claim 15, wherein the mechanism comprises a movable magnet and a magnetic body attached to the fiber.

Claim 17. (Original) The apparatus of claim 1, further comprising a cooling region and a cooling device that regulates the temperature of the cooling region.

Claim 18. (Original) The apparatus of claim 1, further comprising a pre-heating chamber that is capable of heating the hydrogen atmosphere prior to introducing the hydrogen atmosphere into the loading chamber.

Claim 19. (Original) The apparatus of claim 1, wherein the heating element comprises a pre-heating chamber that is capable of heating the hydrogen atmosphere prior to introducing the hydrogen atmosphere into the loading chamber.

Claim 20. (Original) The apparatus of claim 1, wherein the heating element comprises a controllable heater within the loading chamber, wherein the heating element is placed adjacent to the location for the selected portion of the fiber.

Claim 21. (Original) The apparatus of claim 1, further comprising gas inlet and vent lines that can inject and vent the hydrogen atmosphere in the loading chamber.

Claim 22. (Previously presented) The apparatus of claim 1, wherein the at least one pressure seal is adapted to help contain a hydrogen atmosphere within the loading chamber and is physically affixed to the optical fiber.

Claim 23. (Previously presented) The apparatus of claim 1, wherein the at least one pressure seal comprises a curable elastomer.

Claim 24. (Previously presented) The apparatus of claim 1, wherein the at least one pressure seal is located at a boundary between the selected portion of the optical fiber and a non-selected portion.

Claim 25. (Previously presented) The apparatus of claim 1, wherein the at least one pressure seal comprises a re-closable seal that is in contact with the optical fiber when the hydrogen atmosphere is contained in the loading chamber.

Claim 26. (Original) The apparatus of claim 25, wherein the at least one re-closable seal is located at a boundary between the selected portion of the optical fiber and a non-selected portion.

Claim 27. (Original) The apparatus of claim 25, wherein the at least one re-closable seal comprises an elastomeric collet.

Claim 28. (Previously presented) An in-line apparatus for producing a grating in an optical fiber, comprising an optical fiber phosensitizing apparatus for selectively exposing only a selected portion of an optical fiber to a hydrogen atmosphere loading process, the apparatus comprising:

a loading chamber that encloses at least the selected portion of the optical fiber and contains a high-temperature hydrogen atmosphere;

at least one pressure seal in contact with at least one end section of the selected portion of the optical fiber; and

a heating region that locally heats the hydrogen atmosphere surrounding the selected portion to at least 250°C.

Claim 29. (Previously presented) The apparatus of claim 28, further comprising an advancing mechanism to advance the selected portion of the optical fiber out of the loading chamber after loading has been completed.

Claim 30. (Original) The apparatus of claim 29, wherein the advancing mechanism permits advancing a second selected portion of the optical fiber into the loading chamber after loading of the selected portion has been completed.

Claim 31. (Previously presented) An apparatus for exposing only a selected portion of a length of optical fiber to a hydrogen atmosphere loading process, the apparatus comprising:

a loading chamber that encloses at least the selected portion of the optical fiber and contains a hydrogen atmosphere;

at least one heating element that regionally heats the hydrogen atmosphere surrounding the selected portion; and

a pre-heating chamber adapted to heat the hydrogen atmosphere prior to introducing the hydrogen atmosphere into the loading chamber.

Claim 32. (Previously presented) An apparatus for exposing only a selected portion of a length of optical fiber to a hydrogen atmosphere loading process, the apparatus comprising:

a loading chamber that encloses at least the selected portion of the optical fiber and contains a hydrogen atmosphere;

at least one heating element that regionally heats the hydrogen atmosphere surrounding the selected portion; and

first and second clamping vessel blocks, the vessel blocks having pockets that define the loading chamber when the vessel blocks are clamped together.